

1 **Amendment to the Claims**

2 Please cancel Claims 6, 16-19, 21-24, 29, 30, 33, 35, 36, and 52.

3 Please amend Claims 1, 20, 25, 31, 34, 47, 48, 49, 50, and 51; and, add new Claims 53 and
4 54, as follows:

5 1. (Currently Amended) A bending die for use in sheet metal forming, comprising:

6 (a) a first movable component including a first working surface, the first movable
7 component and the first working surface extending longitudinally relative to a longitudinal axis of the
8 bending die, the first working surface being generally planar and comprising a first inner edge
9 extending longitudinally relative to the longitudinal axis of the bending die;

10 (b) a second movable component including a second working surface, the second
11 movable component and the second working surface extending longitudinally relative to the
12 longitudinal axis of the bending die and disposed adjacent to said first working surface, the second
13 working surface being generally planar and comprising a second inner edge extending longitudinally
14 relative to the longitudinal axis of the bending die, the first inner edge and the second inner edge
15 being oriented substantially adjacent to one another in a facing relationship; and

16 (c) a frame configured to provide support for said first and second movable
17 component, while enabling said first and second working surfaces to move relative to the frame, such
18 that a substantially fixed separation between the first inner edge and the second inner edge is
19 maintained, regardless of a rotational angular displacement of either of the first and second movable
20 components, the frame supporting the first and second movable components, wherein a first sector
21 gear engages a first linear rack gear that is attached to the frame to movably support the first movable
22 component, a second sector gear engages a second linear rack gear that is attached to the frame to
23 movably support the second movable component, the first linear rack gear and the second linear rack
24 gears being oriented parallel to each other, the first sector gear and second sector gear being disposed
25 generally adjacent to one another; and using at least one configuration selected from the group
26 consisting essentially of:

27 (i) ~~a first configuration wherein each of said first and second movable~~
28 ~~components comprises at least one sector gear, each such sector gear engaging a linear rack gear that~~
29 ~~is attached to the frame, each sector gear and linear rack gear in combination supporting one of the~~
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1 first and second movable components, such that each linear rack gear is oriented parallel to each
2 other linear rack gear supporting one of the first and second movable components; and

3 (ii) — a second configuration wherein each of said first and second movable
4 components includes a bearing surface disposed at each end thereof, each such bearing surface at one
5 end of the first and second movable components rotatably engaging one opening in the frame that
6 fully encloses the bearing surfaces, and each such bearing surface at the other end of the first and
7 second movable components engaging another opening in the frame that fully encloses the bearing
8 surfaces, each said opening constraining the first and second movable components so that as the first
9 and second movable components move, the substantially fixed separation between the first inner edge
10 and the second inner edge is retained, each of said openings thereby supporting the ends of the first
11 and second movable components, as the first and second movable components pivot relative to each
12 other

13 (d) a hinge assembly coupling the first sector gear to the second sector gear, such
14 that a rotational displacement of one of said first and second working surfaces results in a
15 corresponding rotational displacement of the other of said first and second working surfaces, but in
16 an opposite rotational direction.

17 2. (Previously Presented) The bending die of Claim 1, wherein said adjacent first inner edge
18 and second inner edge are separated by a substantial gap having a predefined width, said substantial
19 gap affecting a configuration of the sheet metal formed with the bending die.

20 3. (Previously Presented) The bending die of Claim 1, wherein the adjacent first inner edge
21 and second inner edge substantially abut one another.

22 4. (Previously Presented) The bending die of Claim 1, wherein said frame comprises a first
23 section and a second section, a position of said first section relative to said second section being
24 adjustable to enable a width of a gap separating the adjacent first inner edge and second inner edge to
25 be adjusted to a desired dimension.

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1 5. (Previously Presented) The bending die of Claim 1, wherein for each working surface:
2 (a) a center of rotation is associated with the working surface;
3 (b) relative to a portion of the working surface that is in contact with a metal sheet
4 during metal forming, the center of rotation is disposed proximate to an inner edge of said portion;
5 and
6 (c) regardless of the rotational angular displacement of the working surface, the
7 center of rotation remains substantially fixed relative to each working surface.

8 6. (Canceled)

9 7. (Previously Presented) The bending die of Claim 47, wherein at least one hinge assembly
10 includes a return spring that applies a restoring force to return said first and second working surfaces
11 to their respective original positions after the sheet metal has been deformed in the bending die, and
12 after a force is no longer applied to deform the sheet metal and the sheet metal has been removed
13 from the bending die.

14 8. (Previously Presented) The bending die of Claim 47, wherein each hinge assembly
15 comprises a pair of sector gears, and a pair of rack gears that are mounted on the frame, each sector
16 gear engaging a different rack gear and being mounted at an end of different ones of the first and
17 second working surfaces.

18 9. (Original) The bending die of Claim 8, wherein said frame includes a generally U-shaped
19 portion defined by support members disposed adjacent to the end of one of the first and second
20 working surfaces, such that each rack gear is attached to a different support member.

21 10. (Previously Presented) The bending die of Claim 47, wherein said first and second
22 working surfaces are each generally rectangular in shape.

23 11. (Previously Presented) The bending die of Claim 47, wherein each hinge assembly
24 further comprises a first link and a second link joined by a pivot shaft, the first link being coupled to
25 one sector gear, and the second link being coupled to another sector gear.

26 12. (Original) The bending die of Claim 1, wherein each of said first and second working surfaces
27 comprises an angled upper surface having a shape selected to facilitate over-bending of the sheet metal.

28 13. (Original) The bending die of Claim 1, further comprising a resist element that applies a
29 resisting force to said first and second working surfaces, the resisting force countering at least in part
30 a force applied to deform the sheet metal.

1 14. (Original) The bending die of Claim 13, wherein the resist element comprises at least one
2 of a stripper, a spring, an elastomeric material, a hydraulic component, a collapsible support, a
3 movable support, and a pneumatic component.

4 15. (Original) The bending die of Claim 13, wherein said resist element comprises:

5 (a) a channel, said channel having a dimension substantially equal to said fixed
6 separation;

7 (b) an elongate block partially disposed in said channel, said elongate block
8 having a dimension smaller than said fixed separation; and

9 (c) a spring disposed in said channel so as to apply a restoring force against said
10 elongate block in opposition to a deformation of the metal sheet into the channel, such that said
11 elongate block is returned to an original position after the metal sheet is removed following the
12 deformation of the metal sheet.

13 16.-19. (Canceled)

14 20. (Currently Amended) The bending die of Claim 1, wherein: ~~each of said first and second~~
15 ~~working surfaces comprises an elongate sector gear, and wherein said frame comprises opposed rack~~
16 ~~gears, such that the elongate sector gear on each one of said first and second working surfaces~~
17 ~~engages a different rack gear~~

18 (a) the first movable component and the first sector gear collectively comprise a
19 first elongate sector gear extending longitudinally along a length of the first working surface, such
20 that the first working surface comprises an upper surface of the first elongate sector gear; and

21 (b) the second movable component and the second sector gear collectively
22 comprise a second elongate sector gear extending longitudinally along a length of the second working
23 surface, such that the second working surface comprises an upper surface of the second elongate
24 sector gear.

25 21.-24. (Canceled)

26 25. (Currently Amended) A press brake for use in sheet metal forming, comprising:

27 (a) a first die extending longitudinally relative to a longitudinal axis of the press
28 brake, said first die including a working surface configured to support a work piece, said working
29 surface having an inner edge and an outer edge and being generally planar;

30 (b) a first sector gear configured to rotatably support the first die;

1 (c) a second die extending longitudinally relative to the longitudinal axis of the
2 press brake and disposed adjacent to said first die, said second die including a working surface
3 configured to support a work piece, said working surface having an inner edge and an outer edge and
4 being generally planar; [[and]]

5 (d) a second sector gear configured to rotatably support the second die;

6 (ee) a frame coupled to and supporting said first and second dies, while enabling
7 said first and second dies to move relative to the frame, such that each die is able to rotate about a
8 different respective center of rotation, and so that regardless of any rotational angular displacement of
9 the die relative to the frame, the inner edge of the die is disposed closer to the respective center of
10 rotation of the die than the outer edge of the die[[:]], the frame supporting the first and second dies
11 ~~using at least one configuration selected from the group consisting essentially of[[:]], the first sector~~
12 gear engaging a first linear rack gear that is attached to the frame, the second sector gear engaging a
13 second linear rack gear that is attached to the frame, the first and second linear rack gears being
14 oriented substantially parallel to each other; and

15 (f) a hinge assembly coupling the first sector gear to the second sector gear, such
16 that a rotational displacement of one of said first and second dies results in a corresponding rotational
17 displacement of the other of said first and second dies, but in an opposite rotational direction, such
18 that the hinge assembly does not extend between the inner edges of the first and second dies

19 ~~(i) a first configuration wherein each of said first and second dies~~
20 ~~comprises at least one sector gear, each such sector gear engaging a linear rack gear that is attached to~~
21 ~~the frame, each sector gear and linear rack gear in combination supporting one of the first and second~~
22 ~~dies, such that each linear rack gear is oriented parallel to each other linear rack gear supporting one~~
23 ~~of the first and second dies; and~~

24 ~~(ii) a second configuration wherein each of said first and second dies~~
25 ~~includes a bearing surface disposed at each end thereof, each such bearing surface at one end of the~~
26 ~~first and second dies rotatably engaging one opening in the frame that fully encloses the bearing~~
27 ~~surfaces, and each such bearing surface at the other end of the first and second dies engaging another~~
28 ~~opening in the frame that fully encloses the bearing surfaces, each said opening constraining the first~~
29 ~~and second dies so that as the first and second movable components move, the substantially fixed~~
30 ~~separation between the first inner edge and the second inner edge is retained, each of said openings~~

1 ~~thereby supporting the ends of the first and second dies, as the first and second dies pivot relative to~~
2 ~~each other.~~

3 26. (Original) The press brake of Claim 25, wherein a substantially fixed separation is
4 maintained between adjacent inner edges of the first and second dies, regardless of the rotational
5 angular displacement of either one of the first and second dies about its respective center of rotation.

6 27. (Original) The press brake of Claim 26, wherein said frame is adjustable, so that said
7 substantially fixed separation can be adjusted to a desired dimension, the desired dimension being
8 substantially maintained regardless of the rotational angular displacement of either of the first and
9 second dies.

10 28. (Previously Presented) The press brake of Claim 25, further comprising at least one
11 spring operatively coupled to at least one of the first and the second dies, producing a restoring force
12 that acts to return said first die and said second die to their respective original positions, after they
13 have been rotatably displaced.

14 29. (Canceled)

15 30. (Canceled)

16 31. (Currently Amended) The press brake of Claim 25, wherein ~~each of said first and second~~
17 ~~dies comprises an elongate sector gear, and wherein said frame comprises opposed rack gears, each~~
18 ~~elongate sector gear of said first and second dies engaging a different rack gear~~ the first die and the
19 first sector gear collectively comprise a first elongate sector gear substantially extending along a
20 longitudinal axis of the first die, and the second die and the second sector gear collectively comprise
21 a second elongate sector gear substantially extending along a longitudinal axis of the second die.

22 32. (Original) The press brake of Claim 25, further comprising means for applying a force to
23 each of said first and second dies, the force being applied for one of:

24 (a) countering at least in part a force applied to deform the sheet metal; and

25 (b) causing the rotational angular displacement of said first and second dies, in
26 order to achieve a desired deformation of the sheet metal.

27 33. (Canceled)

28 34. (Currently Amended) The press brake of ~~Claim 25~~ Claim 32, wherein said means
29 comprises one of a spring, an elastomeric material, a hydraulic system, and a pneumatic system.

30 35.-46. (Canceled)

1 47. (Currently Amended) A bending die for use in sheet metal forming, comprising:

2 (a) a first working surface extending longitudinally relative to a longitudinal axis
3 of the bending die, the first working surface being generally planar and comprising a first inner edge,
4 a first latitudinal end, and a second latitudinal end, the first inner edge substantially extending from
5 the first latitudinal end to the second latitudinal end, the first inner edge being substantially
6 orthogonal to the first and second latitudinal ends;

7 (b) a second working surface extending longitudinally relative to the longitudinal
8 axis of the bending die ~~and,~~ the second working surface being generally planar and comprising a
9 second inner edge, a third latitudinal end, and a fourth latitudinal end, the second inner edge
10 substantially extending from the third latitudinal end to the fourth latitudinal end, the second inner
11 edge being substantially orthogonal to the third and fourth latitudinal ends, the second working
12 surface being disposed adjacent to said first working surface, such that the first and second inner
13 edges are disposed in a facing relationship when the first and second working surfaces are in a rest
14 position;

15 (c) a frame configured to provide support for said first and second working
16 surfaces, while enabling said first and second working surfaces to move relative to the frame, such
17 that a substantially fixed separation between adjacent edges of the first and second working surfaces
18 is maintained, regardless of a rotational angular displacement of either of the first and second
19 working surfaces; [[and]]

20 (d) a first hinge assembly disposed at each latitudinal end of the first and second
21 working surfaces, proximate the first latitudinal end and the third latitudinal; and

22 (e) a second hinge assembly disposed proximate the second latitudinal end and the
23 fourth latitudinal end, each hinge assembly pivotally coupling said first and second working surfaces
24 together, such that a rotational displacement of one of said first and second working surfaces results
25 in a corresponding rotational displacement of the other one of said first and second working surfaces,
26 through but in an opposite rotational direction[[],] each such hinge assembly being disposed generally
27 orthogonal to the longitudinal axis of the bending die.

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1 48. (Currently Amended) A bending die for use in sheet metal forming, comprising:

2 (a) a first working surface extending longitudinally relative to a longitudinal axis
3 of the bending die, a sector gear being coupled to said first working surface;

4 (b) a second working surface extending longitudinally relative to the longitudinal
5 axis of the bending die and disposed adjacent to said first working surface, a sector gear being
6 coupled to said second working surface;

7 (c) a frame configured to provide support for said first and second working
8 surfaces, while enabling said first and second working surfaces to move relative to the frame, such
9 that a substantially fixed separation between adjacent edges of the first and second working surfaces
10 is maintained, regardless of a rotational angular displacement of either of the first and second
11 working surfaces; and

12 (d) a hinge assembly disposed at an end of the first and second working surfaces,
13 the hinge assembly pivotally coupling said first and second working surfaces together, such that a
14 rotational displacement of one of said first and second working surfaces results in a corresponding
15 rotational displacement of the other one of said first and second working surfaces, through an
16 opposite rotational direction, the hinge assembly comprising a first link and a second link joined by a
17 pivot shaft, the first link being coupled to ~~[[the]]~~ a sector gear coupled to the first working surface,
18 and the second link being coupled to ~~[[the]]~~ a different sector gear coupled to the second working
19 surface.

20 49. (Currently Amended) A bending die for use in sheet metal forming, comprising:

21 (a) a first working surface extending longitudinally relative to a longitudinal axis
22 of the bending die;

23 (b) a second working surface extending longitudinally relative to the longitudinal
24 axis of the bending die and disposed adjacent to said first working surface;

25 (c) a frame configured to provide support for said first and second working
26 surfaces, while enabling said first and second working surfaces to move relative to the frame, such
27 that a substantially fixed separation between adjacent edges of the first and second working surfaces
28 is maintained, regardless of a rotational angular displacement of either of the first and second
29 working surfaces; ~~[[and]]~~
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1 (d) a first hinge assembly disposed at each latitudinal end of the first and second
2 working surfaces, comprising a first sector gear and a second sector gear that are physically linked
3 together, each of the first and the second sector gears engaging a rack gear that is mounted on the
4 frame, the first sector gear supporting the first working surface, and the second sector gear supporting
5 the second working surface; and

6 (e) a second hinge assembly comprising a third sector gear and a fourth sector gear
7 that are physically linked together, each of the third and the fourth sector gears engaging a rack gear
8 that is mounted on the frame, the third sector gear supporting the first working surface, and the fourth
9 sector gear supporting the second working surface, each hinge assembly pivotally coupling said first
10 and second working surfaces together, such that a rotational displacement of one of said first and
11 second working surfaces results in a corresponding rotational displacement of the other one of said
12 first and second working surfaces, through but in an opposite rotational direction, each hinge
13 assembly comprising a pair of sector gears that are physically linked together, and a pair of rack gears
14 that are mounted on the frame, each sector gear engaging a different rack gear and being mounted at
15 an end of different ones of the first and second working surfaces without requiring the hinge
16 assemblies to extend between opposed inner edges of the first and working surfaces.

17 50. (Currently Amended) A press brake for use in sheet metal forming, comprising:

18 (a) a first die extending longitudinally relative to a longitudinal axis of the press
19 brake, said first die including a working surface configured to support a work piece, said working
20 surface having an inner edge and an outer edge;

21 (b) a second die extending longitudinally relative to the longitudinal axis of the
22 press brake and disposed adjacent to said first die, said second die including a working surface
23 configured to support a work piece, said working surface having an inner edge and an outer edge;
24 [[and]]

25 (c) a first support structure configured to rotatably support the first die;

26 (d) a second support structure configured to rotatably support the second die; and

27 (e) a frame coupled to and supporting said first and second [[dies]] support
28 structures, while the first and second support structures enabling said first and second dies to move
29 relative to the frame, such that each die is able to rotate about a different respective center of rotation,
30 and so that regardless of any rotational angular displacement of the die relative to the frame, the inner

1 edge of the die is disposed closer to the respective center of rotation of the die than the outer edge of
2 the die, ~~wherein said frame comprises a first section and a second section, the first support structure~~
3 ~~being fixed in a position relative to a first section of the frame, the second support structure being~~
4 ~~fixed in a position relative to a second section of the frame, a position of said first section relative to~~
5 ~~said second section being adjustable to enable a width of a gap separating adjacent inner edges of the~~
6 ~~working surfaces of the first and second dies to be adjusted to a desired dimension.~~

7 51. (Currently Amended) A bending die for use in sheet metal forming, comprising:

8 (a) a first working surface extending longitudinally relative to a longitudinal axis
9 of the bending die;

10 (b) a second working surface extending longitudinally relative to the longitudinal
11 axis of the bending die and disposed adjacent to said first working surface; [[and]]

12 (c) a first support structure configured to rotatably support the first die, the first
13 support structure comprising a rack gear and a sector gear;

14 (d) a second support structure configured to rotatably support the second die, the
15 second support structure also comprising a rack gear and a sector gear; and

16 (e) a frame configured to provide support for said first and second ~~working~~
17 ~~surfaces support structures~~, while enabling said first and second working surfaces to move relative to
18 the frame, such that a substantially fixed separation between adjacent edges of the first and second
19 working surfaces is maintained, regardless of a rotational angular displacement of either of the first
20 and second working surfaces, wherein said frame comprises a first section and a second section, a
21 position of said first section relative to said second section being adjustable to enable a width of a gap
22 separating adjacent inner edges of the first and second working surfaces to be adjusted to a desired
23 dimension.

24 52. (Canceled)

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1 53. (New) A bending die for use in sheet metal forming, comprising:

2 (a) a first movable component including a first working surface, the first movable
3 component and the first working surface extending longitudinally relative to a longitudinal axis of the
4 bending die, the first working surface being generally planar and comprising a first inner edge
5 extending longitudinally relative to the longitudinal axis of the bending die;

6 (b) a second movable component including a second working surface, the second
7 movable component and the second working surface extending longitudinally relative to the
8 longitudinal axis of the bending die and disposed adjacent to said first working surface, the second
9 working surface being generally planar and comprising a second inner edge extending longitudinally
10 relative to the longitudinal axis of the bending die, the first inner edge and the second inner edge
11 being oriented substantially adjacent to one another in a facing relationship; and

12 (c) a frame configured to provide support for said first and second movable
13 components, while enabling said first and second working surfaces to move relative to the frame,
14 such that a substantially fixed separation between the first inner edge and the second inner edge is
15 maintained, regardless of a rotational angular displacement of either of the first and second movable
16 components, the frame supporting the first and second movable components, wherein each of said
17 first and second movable components comprises at least one sector gear, each such sector gear
18 engaging a linear rack gear that is attached to the frame, each sector gear and linear rack gear in
19 combination supporting one of the first and second movable components, such that each linear rack
20 gear is oriented parallel to each other linear rack gear supporting either of the first and second
21 movable components.

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1 54. (New) A bending die for use in sheet metal forming, comprising:
2 (a) a first working surface extending longitudinally relative to a longitudinal axis
3 of the bending die;
4 (b) a second working surface extending longitudinally relative to the longitudinal
5 axis of the bending die and disposed adjacent to said first working surface;
6 (c) a frame configured to provide support for said first and second working
7 surfaces, while enabling said first and second working surfaces to move relative to the frame, such
8 that a substantially fixed separation between adjacent edges of the first and second working surfaces
9 is maintained, regardless of a rotational angular displacement of either of the first and second
10 working surfaces; and
11 (d) a hinge assembly disposed at a latitudinal end of the first and second working
12 surfaces, the hinge assembly pivotally coupling said first and second working surfaces together, such
13 that a rotational displacement of one of said first and second working surfaces results in a
14 corresponding rotational displacement of the other of said first and second working surfaces, but in
15 an opposite rotational direction, the hinge assembly being disposed generally orthogonal to the
16 longitudinal axis of the bending die, wherein the hinge assembly comprises a first link and a second
17 link joined by a pivot shaft, the first link being coupled to a first sector gear, and the second link
18 being coupled to a second sector gear.